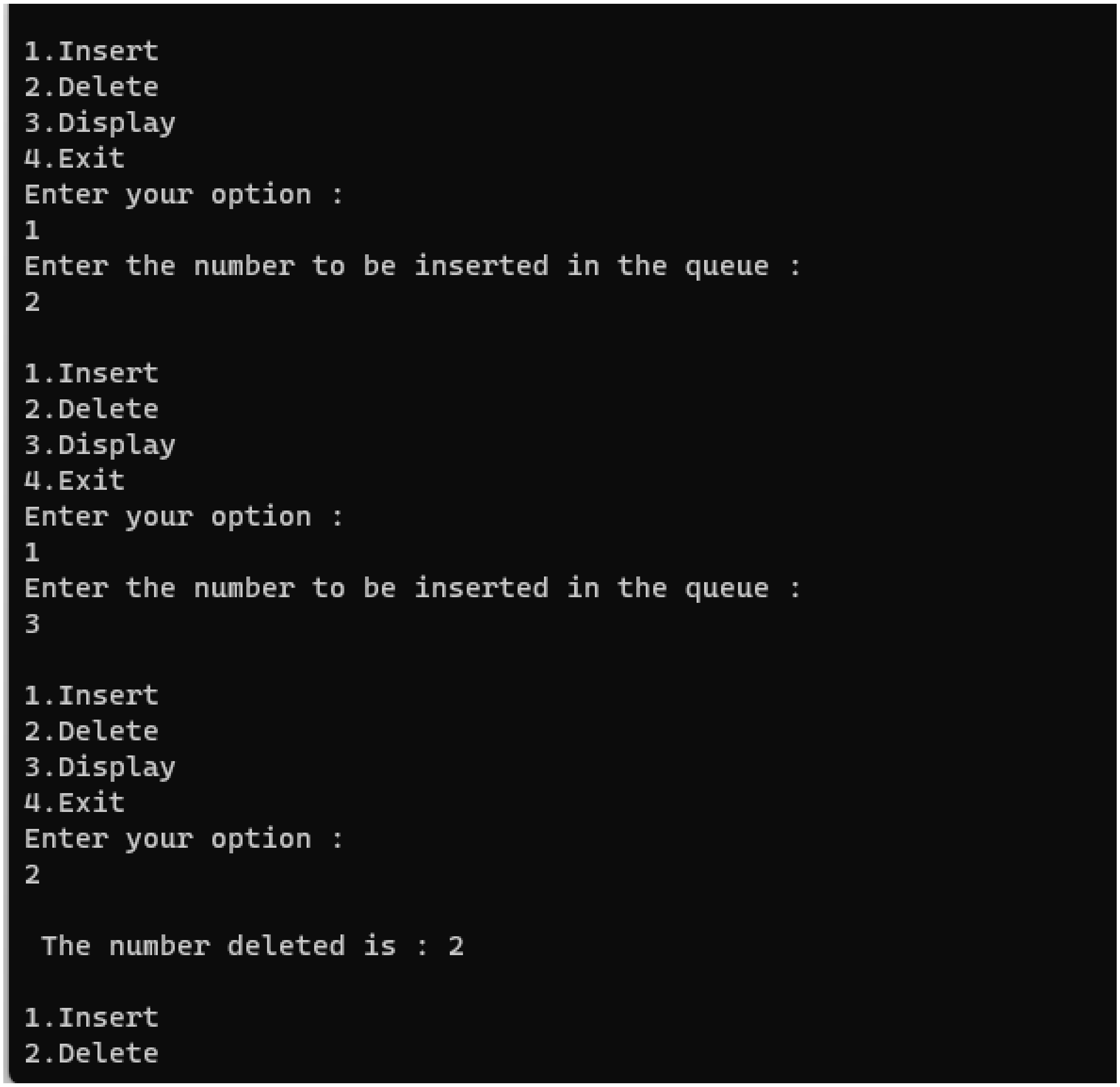
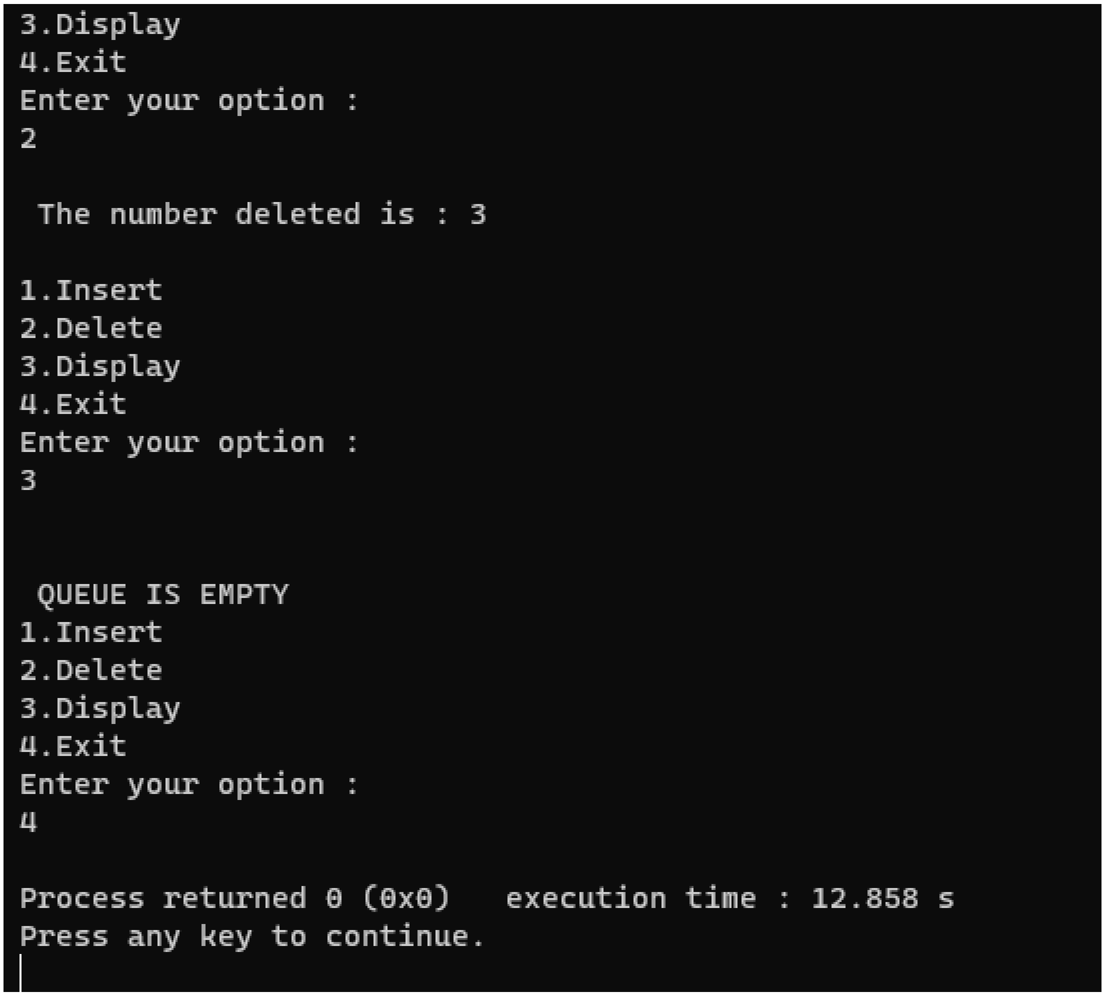
```
#include <stdio.h>
#define N 5

int q[N];
int front = -1, rear = -1;
void insert(int);
int delete();
void display();
void main()
{
    int n, choice;
    do
    {
        printf("\n1.Insert\n2.Delete\n3.Display\n4.Exit\n");
        printf("Enter your option : \n");
        scanf("%d", &choice);
        switch (choice)
        {
        case 1:
            printf("Enter the number to be inserted in the queue : \n");
            scanf("%d", &n);
            insert(n);
            break;
        case 2:
            n = delete ();
            if (n != -1)
                printf("\n The number deleted is : %d\n", n);
            break;
        case 3:
            display();
            break;
        case 4:
            exit(0);
            break;
        default:
            printf("Invalid option\n");
            exit(0);
            break;
        }
    } while (choice != 4);
}
void insert(int num)
{
    if (rear == N - 1)
        printf("\n OVERFLOW");
    else if (front == -1 && rear == -1)
        front = rear = 0;
    else
        rear++;
    q[rear] = num;
}
int delete()
{
    int val;
    if (front == -1 || front > rear)
    {
        printf("\n UNDERFLOW");
        return -1;
    }
    else
    {
        val = q[front];
        front++;
        if (front > rear)
            front = rear = -1;
        return val;
    }
}
void display()
{
    int i;
    printf("\n");
    if (front == -1 || front > rear)
        printf("\n QUEUE IS EMPTY");
    else
    {
        for (i = front; i <= rear; i++)
            printf("\t %d", q[i]);
    }
}
```



```
1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
1
Enter the number to be inserted in the queue :
2

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
1
Enter the number to be inserted in the queue :
3

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
2

 The number deleted is : 2

1.Insert
2.Delete
```

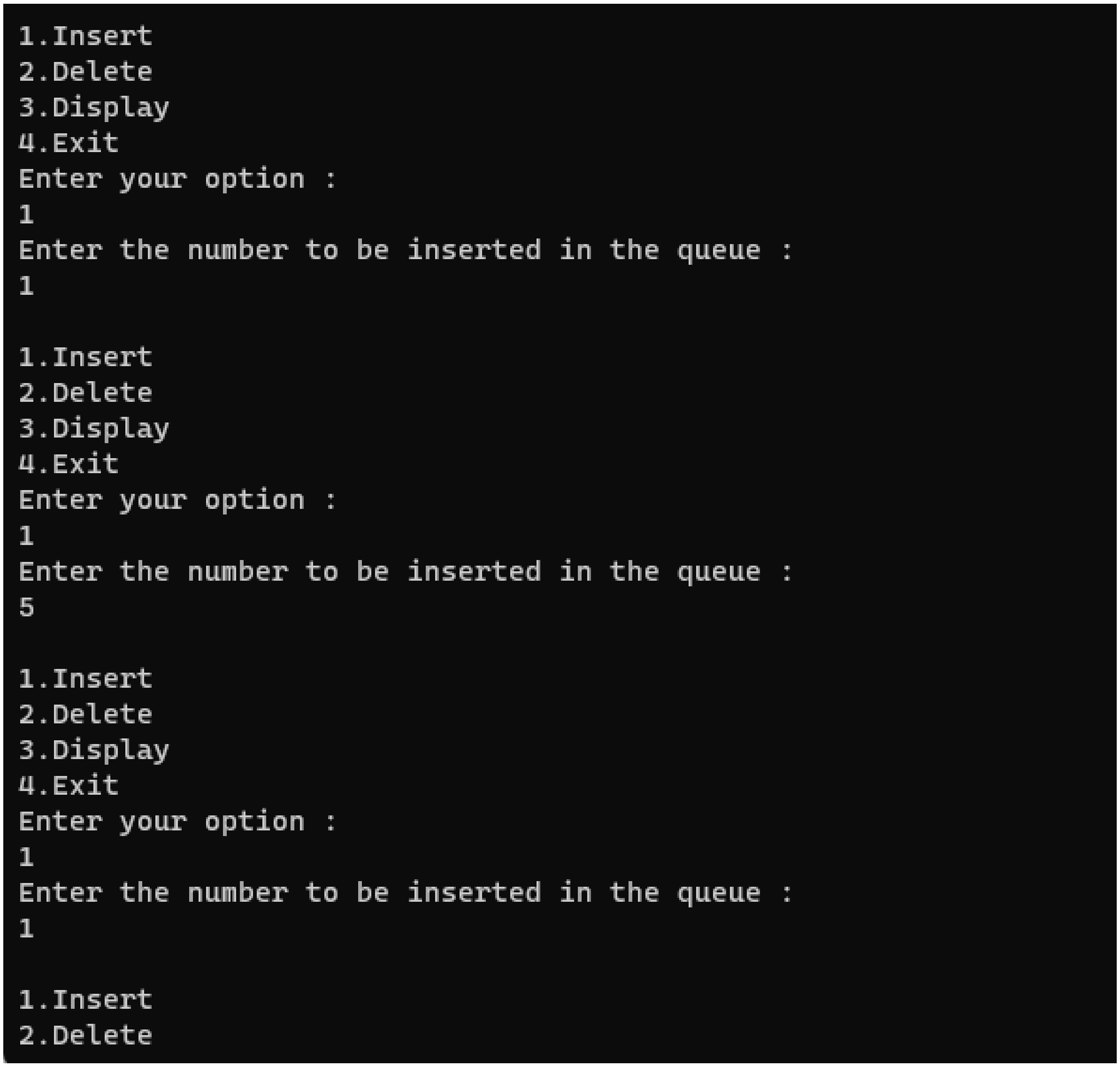


```
3.Display
4.Exit
Enter your option :
2

 The number deleted is : 3

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
3


 QUEUE IS EMPTY
1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
4

Process returned 0 (0x0)   execution time : 12.858 s
Press any key to continue.
```

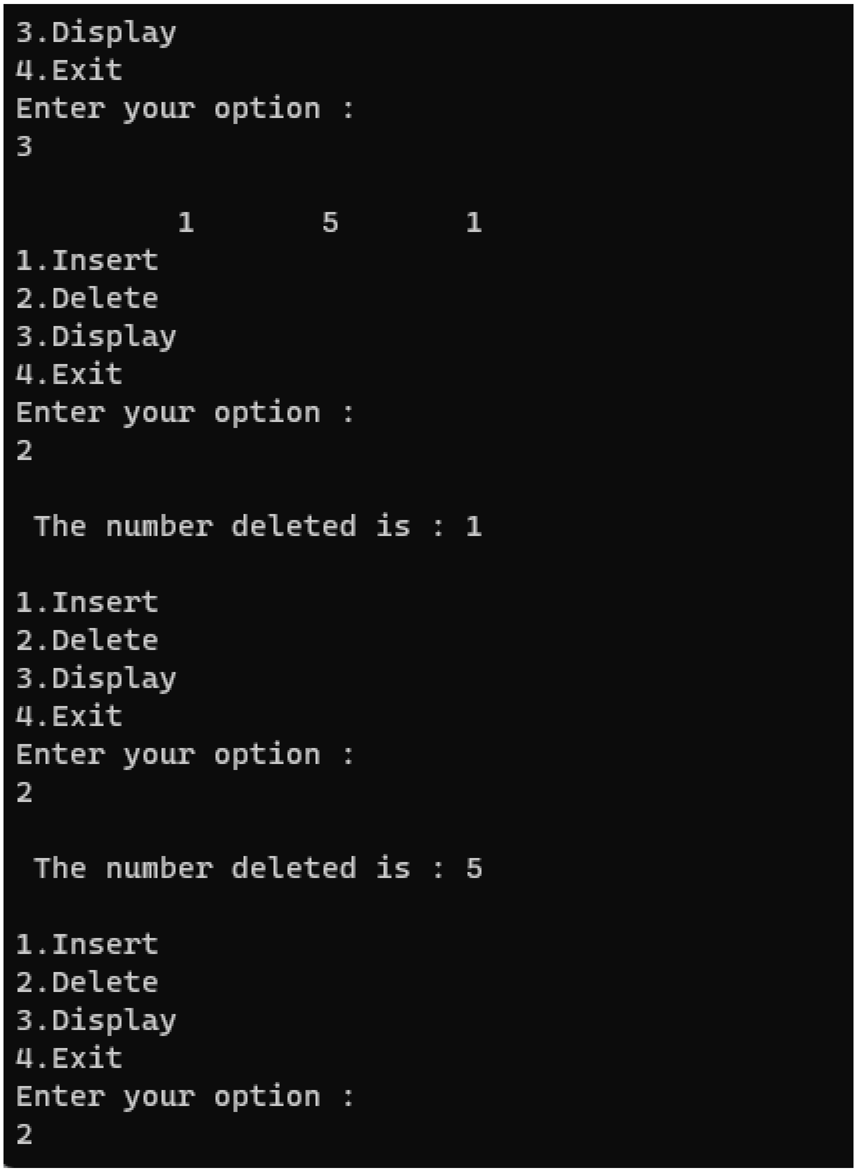
CIRCULAR QUEUE INPLIMENTATION :

```
#include <stdio.h>
#define N 5

int q[N];
int front = -1, rear = -1;
void insert(int);
int delete();
void display();
void main()
{
   int n, choice;
   do
```

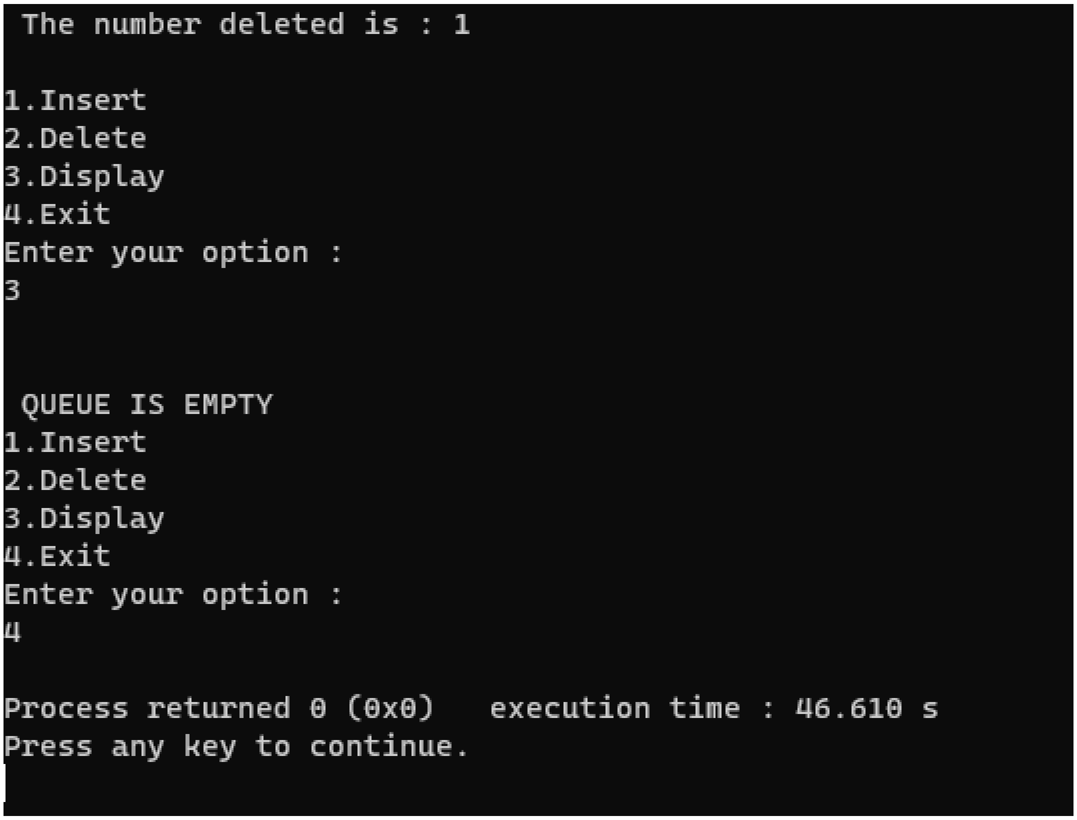
```
    {
        printf("\n1.Insert\n2.Delete\n3.Display\n4.Exit\n");
        printf("Enter your option : \n");
        scanf("%d", &choice);
        switch (choice)
        {
        case 1:
            printf("Enter the number to be inserted in the queue : \n");
            scanf("%d", &n);
            insert(n);
            break;
        case 2:
            n = delete ();
            if (n != -1)
                printf("\n The number deleted is : %d\n", n);
            break;
        case 3:
            display();
            break;
        case 4:
            exit(0);
            break;
        default:
            printf("Invalid option\n");
            exit(0);
            break;
        }
    } while (choice != 4);
}
void insert(int num)
{
    if ((front == 0 && rear == N - 1) || (rear == (front - 1)))
        printf("\n OVERFLOW");
    else if (front == -1 && rear == -1)
    {
        front = rear = 0;
        q[rear] = num;
    }
    else if (rear == N - 1 && front != 0)
    {
        rear = 0;
        q[rear] = num;
    }
    else
    {
        rear++;
        q[rear] = num;
    }
}
int delete()
{
    int val;
    if (front == -1 && rear == -1)
    {
        printf("\n UNDERFLOW");
        return -1;
    }
    val = q[front];
    if (front == rear)
        front = rear = -1;
    else
    {
        if (front == N - 1)
            front = 0;
        else
            front++;
    }
    return val;
}
void display()
{
    int i;
    printf("\n");
    if (front == -1 && rear == -1)
        printf("\n QUEUE IS EMPTY");
    else
    {
        if (front < rear)
        {
            for (i = front; i <= rear; i++)
                printf("\t %d", q[i]);
        }
        else
        {
            for (i = front; i < N; i++)
                printf("\t %d", q[i]);
            for (i = 0; i <= rear; i++)
                printf("\t %d", q[i]);
    }
  }
}
```



```
1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
1
Enter the number to be inserted in the queue :
1

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
1
Enter the number to be inserted in the queue :
5

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
1
Enter the number to be inserted in the queue :
1

1.Insert
2.Delete
```



```
3.Display
4.Exit
Enter your option :
3

         1       5       1
1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
2

 The number deleted is : 1

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
2

 The number deleted is : 5

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
2
```



```
 The number deleted is : 1

1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
3


 QUEUE IS EMPTY
1.Insert
2.Delete
3.Display
4.Exit
Enter your option :
4

Process returned 0 (0x0)   execution time : 46.610 s
Press any key to continue.
```